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EPA (Environmental Protection Agency)
Pesticide Fact Sheet 2-(2,4-Dichlorophenoxy)
Propionic Acid

(U.S.) Environmental Protection Agency
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This document contains up-to-date chemical information, including a summary of the Agency's regulatory position and rationale, on a specific pesticide or group of pesticides. A Fact Sheet is issued after one of the the following actions has occurred.

1. Issuance or reissuance of a registration standard,
2. Issuance of each special review document,
3. Registration of a significantly changed use pattern,
4. Registration of a new chemical, or
5. An immediate need for information to resolve controversial issues relating to a specific chemical or use pattern.

17. Document Analysis a. Descriptors

Pesticides, regulations, Chemical Information Fact Sheet, Use Patterns, science findings.

b. Identifiers/Open-Ended Terms

c. COSATI Field/Group

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EPA

Pesticide Fact Sheet

Name of Chemical: 2-(2,4-dichlorophenoxy) propionic acid*
Reason for Issuance: Registration Standard
Date Issued: September 1988
Fact Sheet Number: 180

*and amine salts and esters

DESCRIPTION OF CHEMICAL(S)

Generic Name(s): 2-(2,4-dichlorophenoxy)propionic acid
2,4,DP, diethanolamine salt
2,4-DP, dimethylamine salt
2,4-DP, butoxyethyl ester
2,4-DP, isooctyl ester

Common Names(s): 2,4-DP, or dichlorprop, and its amines and esters.

Trade Name(s): 2,4-DP is available under a number of trade names, most often formulated as an amine salt or ester.

EPA Shaughnessy Codes: 031401 (acid)
031416 (diethanolamine salt)
031419 (dimethylamine salt)
031453 (butoxyethyl ester)
031463 (isooctyl ester)

Chemical Abstracts Service (CAS) Number: 120-36-5 (acid)
84731-66-8 (diethanolamine salt)
53404-32-3 (dimethylamine salt)
53404-31-2 (butoxyethyl ester)
28631-35-8 (isooctyl ester)

Year of Initial Registration: 1968 (acid).

Pesticide Type: Herbicide; plant growth regulator.

Chemical Family: Chlorinated phenoxy.

U.S. and Foreign Producers: 2,4-DP technical products are manufactured by a number of companies, both U.S. and foreign.

USE PATTERNS AND FORMULATIONS

Registered Uses: Terrestrial Nonfood (golf courses, noncrop and recreational areas); Aquatic Nonfood (drainage ditchbanks); Domestic Outdoor (home lawns); Forestry (conifer/pine release forest plantation site preparation).

Predominant Uses: Ornamental turf, e.g., golf courses and home lawns (approximately 57% of total usage); rights-of-way/roadways (approximately 42% of total usage).

Formulation Types Registered: Granular; liquid (emulsifiable concentrate, soluble concentrate, ready-to-use); aerosol spray.

Methods of Application: Ground equipment and aircraft.

SCIENCE FINDINGS

Existing data are inadequate to assess environmental and health effects for 2,4-DP. Available data indicate that 2,4-DP is not oncogenic in the rat, but there is a positive trend for mutagenic effects. There is also some potential for toxicity to aquatic organisms. Additional chronic toxicological testing is not required since there are no registered food uses for 2,4-DP.

2,4-DP is generally formulated as an amine salt or ester. The amine and ester forms may differ in biological activity and environmental fate from the parent compound. Data are needed on each amine and ester, as well as the acid, to enable a complete assessment.

Concern about possible groundwater contamination exists for the family of 2,4-D compounds (2,4-D, 2,4-DB and 2,4-DP). Additional data and a label warning statement are required.

Chemical Characteristics. (2,4-DP acid technical)

Physical State - Crystalline solid; flakes.
Color - White to tan.
Odor - Slight phenolic.
Molecular weight - 235.1.
Empirical formula - $C_9H_8Cl_2O_3$.
Melting point - 116 - 118 °C.
Solubility - Highly soluble in acetone, benzene, carbon tetrachloride, diesel oil and kerosene; slightly soluble in water.
Vapor pressure - Negligible at 20° C.
Specific gravity - 1.186 at 20° C.
Stability - Stable to melting point.

Toxicological Characteristics. (NOTE: 2,4-DP acid is test material unless specified otherwise).

Acute Toxicity - Oral LD_{50} (mouse): 500 mg/kg (males)
620 mg/kg (females)
(rat): 700 mg/kg (males)
500 mg/kg (females)

Toxicity Category III

Subchronic Toxicity - Oral studies in rats and dogs were inconclusive. Some kidney and liver effects were noted.

Chronic Toxicity -

Chronic Feeding/
Oncogenicity (rat): LOEL for systemic effects 11 mg/kg (male), 13 mg/kg (female); NOEL 4 mg/kg. No significant increase in tumor incidence in any organ. Kidney and liver toxicity and decreased body weight/food efficiency at highest dose level. No oncogenic effects under conditions of the study.

Oncogenicity (mouse): LOEL for systemic effects 25 mg/kg; NOEL not established. No oncogenic effects under conditions of the study, but study inadequate due to numerous reporting deficiencies.

Teratology: No acceptable data.

Reproduction (rat): LOEL for maternal and developmental toxicity 100 mg/kg; NOEL 50 mg/kg. No reproduction or fertility effects under conditions of the study, but study inadequate due to numerous reporting deficiencies.

Mutagenicity: There is a positive trend for mutagenic effects for both 2,4-DP acid and 2,4-DP butoxyethyl ester. Additional data are required for each 2,4-DP compound.

Metabolism: No acceptable data.

Physiological and Behavioral Characteristics.

Mechanism of Pesticide Action: Phenoxy herbicides (including 2,4-DP) are hormone weed killers affecting the activity of enzymes, respiration and cell division.

Environmental Characteristics.

No data are available.

Ecological Characteristics.

Avian Toxicity: No acute oral studies available. Dietary studies indicate 2,4-DP butoxyethyl ester is practically nontoxic (LC_{50} >10,000 ppm) to waterfowl and upland game birds.

Aquatic Organism Toxicity: Acceptable data indicate 2,4-DP butoxyethyl ester is highly toxic to fish and freshwater invertebrates.

Non-Target Insect Toxicity: No data are available.

Non-Target Plants/ Endangered Species: Since 2,4-DP is a broadleaf herbicide a potential hazard exists for non-target plants. Hazard assessments for endangered species cannot be completed until additional data are received.

Tolerance Assessment. There are no registered food or feed uses for 2,4-DP acid or its amines or esters that require the establishment of tolerances.

Reported Pesticide Incidents. Based on the Pesticide Incident Monitoring System files covering the period 1966 to 1979, reports were received concerning off-target movement for unspecified 2,4-D (family) compounds. The incidents involved drift from aerial (173 reports) and ground (104 reports) application, as well as volatilization (35 reports) and resulted in damage to non-target crops and other desirable plants.

SUMMARY OF REGULATORY POSITION AND RATIONALE

Summary of Agency Position. The Agency is requiring additional toxicological data for 2,4-DP and will further evaluate the mutagenic and teratogenic potential of 2,4-DP when additional data are received. Environmental effects will also be evaluated when data gaps for fish/wildlife and environmental fate are filled. The Agency will not establish any significant new uses until Registration Standard data are reviewed.

Unique Label Warning Statements.

1. Environmental Hazards - (butoxyethyl ester).

   Manufacturing-use: "This product is toxic to fish."

   End-use: "This product is toxic to fish and aquatic invertebrates."

2. Groundwater/Protective Clothing - (end-use products).

   "This product can reach groundwater as a result of mixing/loading or from improper handling. To minimize groundwater contamination from spills during mixing/loading/cleaning of equipment, take the following steps:"

   (Liquid only) - "Mixing and loading: When mixing, loading or applying this product, wear chemical resistant gloves. Wash nondisposable gloves thoroughly with soap and water before removing. The mixing and loading of spray mixtures into the spray equipment must be carried out on an impervious pad (i.e., concrete slab, plastic sheeting) large enough to catch any spilled material. If spills occur, contain the spill by using an absorbent material (e.g., sand, earth or synthetic absorbent). Dispose of the contaminated absorbent material by placing in a plastic bag and following disposal instructions on this label. Triple rinse empty containers and add the rinsate to the mixing tank."

   (Granular only) - "Handling: When handling this product, wear chemical resistant gloves. Wash nondisposable gloves thoroughly with soap and water before removing. If spills occur, collect the material and dispose of by following disposal instructions on this label."

   (Liquid and granular) - "Cleaning of equipment: When cleaning equipment, do not pour the washwater on the ground; spray or drain over a large area away from wells and other water sources."

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SUMMARY OF MAJOR DATA GAPS: The following data are required for 2,4-DP acid. The Agency is also requiring data on each individual amine and ester of 2,4-DP. Specific requirements are detailed in the Data Tables, Appendix I of the Registration Standard.

	Due Date (From Issuance of Standard)
Product Chemistry	6 - 15 months
Toxicology:	9 - 18 months
Acutes	
Subchronic oral and dermal	
Teratogenicity	
Mutagenicity	
Ecological Effects:	9 - 12 months
Avian oral/dietary	
Aquatic organisms (freshwater fish/ invertebrates)	
Non-target insect and plant studies	
Environmental Fate:	9 - 27 months
Hydrolysis	
Metabolism	
Mobility	
Dissipation	
Fish Accumulation	

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DISCLAIMER: The information presented in this Pesticide Fact Sheet is for informational purposes only and may not be used to fulfill data requirements for pesticide registration and reregistration.